

object can be displayed on the touch screen. This typically occurs when at least one of the fingers is positioned over the GUI object. As a result, when the fingers are moved apart, the zoom-in signal can be used to increase the size of the embedded features in the GUI object and when the fingers are pinched together, the zoom-out signal can be used to decrease the size of embedded features in the object. The zooming typically occurs within a predefined boundary such as the periphery of the display, the periphery of a window, the edge of the GUI object, and/or the like. The embedded features may be formed on a plurality of layers, each of which represents a different level of zoom. In most cases, the amount of zooming varies according to the distance between the two objects. Furthermore, the zooming typically can occur substantially simultaneously with the motion of the objects. For instance, as the fingers spread apart or closes together, the object zooms in or zooms out at the same time. Although this methodology is directed at zooming, it should be noted that it may also be used for enlarging or reducing. The zoom gesture method 350 may be particularly useful in graphical programs such as publishing, photo, and drawing programs. Moreover, zooming may be used to control a peripheral device such as a camera, i.e., when the finger is spread apart, the camera zooms out and when the fingers are closed the camera zooms in.

[0098] FIGS. 11A-11H illustrate a zooming sequence using the method described above. FIG. 11A illustrates a display presenting a GUI object 364 in the form of a map of North America with embedded levels which can be zoomed. In some cases, as shown, the GUI object is positioned inside a window that forms a boundary of the GUI object 364. FIG. 11B illustrates a user positioning their fingers 366 over a region of North America 368, particularly the United States 370 and more particularly California 372. In order to zoom in on California 372, the user starts to spread their fingers 366 apart as shown in FIG. 11C. As the fingers 366 spread apart further (distance increases), the map zooms in further on Northern California 374, then to a particular region of Northern California 374, then to the Bay area 376, then to the peninsula 378 (e.g., the area between San Francisco and San Jose Area), and then to the city of San Carlos 380 located between San Francisco and San Jose as illustrated in FIGS. 11D-11H. In order to zoom out of San Carlos 380 and back to North America 368, the fingers 366 are closed back together following the sequence described above, but in reverse.

[0099] FIG. 12 is a diagram of a pan method 400, in accordance with one embodiment of the present invention. The pan gesture may be performed on a multipoint touch screen. The pan method 400 generally begins at block 402 where the presence of at least a first object and a second object are detected on a touch sensitive surface at the same time. The presence of at least two fingers is configured to indicate that the touch is a gestural touch rather than a tracking touch based on one finger. In some cases, the presence of only two fingers indicates that the touch is a gestural touch. In other cases, any number of more than two fingers indicates that the touch is a gestural touch. In fact, the gestural touch may be configured to operate whether two, three, four or more fingers are touching, and even if the numbers change during the gesture, i.e., only need a minimum of two fingers. Following block 402, the pan method 400 proceeds to block 404 where the position of the two objects when the objects are moved together across the

touch screen is monitored. Following block 404, the pan method 400 proceeds to block 406 where a pan signal is generated when the position of the two objects changes relative to an initial position. In most cases, the set down of the fingers will associate or lock the fingers to a particular GUI object displayed on the touch screen. Typically, when at least one of the fingers is positioned over the image on the GUI object. As a result, when the fingers are moved together across the touch screen, the pan signal can be used to translate the image in the direction of the fingers. In most cases, the amount of panning varies according to the distance the two objects move. Furthermore, the panning typically can occur substantially simultaneously with the motion of the objects. For instance, as the fingers move, the object moves with the fingers at the same time.

[0100] FIGS. 13A-13D illustrate a panning sequence based on the pan method 400 described above. Using the map of FIG. 11, FIG. 13A illustrates a user positioning their fingers 366 over the map. Upon set down, the fingers 366 are locked to the map. As shown in FIG. 13B, when the fingers 366 are moved vertically up, the entire map 364 is moved up thereby causing previously seen portions of map 364 to be placed outside the viewing area and unseen portions of the map 364 to be placed inside the viewing area. As shown in FIG. 13C, when the fingers 366 are moved horizontally sideways, the entire map 364 is moved sideways thereby causing previously seen portions of map 364 to be placed outside the viewing area and unseen portions of the map to be placed inside the viewing area. As shown in FIG. 13D, when the fingers 366 are moved diagonally, the entire map 364 is moved diagonally thereby causing previously seen portions of map 364 to be placed outside the viewing area and unseen portions of the map to be placed inside the viewing area. As should be appreciated, the motion of the map 364 follows the motion of the fingers 366. This process is similar to sliding a piece of paper along a table. The pressure the fingers exert on the paper locks the paper to the fingers and when the fingers are slid across the table, the piece of paper moves with them.

[0101] FIG. 14 is a diagram of a rotate method 450, in accordance with one embodiment of the present invention. The rotate gesture may be performed on a multipoint touch screen. The rotate method 450 generally begins at block 452 where the presence of a first object and a second object are detected at the same time. The presence of at least two fingers is configured to indicate that the touch is a gestural touch rather than a tracking touch based on one finger. In some cases, the presence of only two fingers indicates that the touch is a gestural touch. In other cases, any number of more than two fingers indicates that the touch is a gestural touch. In fact, the gestural touch may be configured to operate whether two, three, four or more fingers are touching, and even if the numbers change during the gesture, i.e., only need a minimum of two fingers.

[0102] Following block 452, the rotate method 450 proceeds to block 454 where the angle of each of the finger is set. The angles are typically determined relative to a reference point. Following block 454, rotate method 450 proceeds to block 456 where a rotate signal is generated when the angle of at least one of the objects changes relative to the reference point. In most cases, the set down of the fingers will associate or lock the fingers to a particular GUI object displayed on the touch screen. Typically, when at least one